

the basal centres, but it is needful to admit that these last may physiologically be centres of voluntary motion, since the development or perfection of this their function produces the cure of the paralytic phenomena, and produces it all the more quickly the more developed this function is normally.

A. PITRES, *Thèse de Doctorat*, Paris, 1878 (abst. in *Revue des Sciences Médicales*).

To show that lesions of the subcortical white substance produce exactly the same effects as those of the convolutions, is the object of this important memoir. In order to fulfill it, M. Pitres insists in his first part on the possibility of subdividing and describing this apparently homogeneous *centrum ovale*, and first he divides it into three zones: prefrontal or anterior, occipito-sphenoidal, and fronto-parietal. This last zone, according to Pitres, is limited by two vertical planes: the one passing within five centimetres of the fissure of Rolando, the other passing one centimetre in front of the internal perpendicular fissure. Situated between the opto-striate bodies and the alleged motor convolutions, this median zone of the *centrum ovale* may be subdivided into four regions: pediculo-frontal, frontal, parietal and pediculo-parietal, each corresponding to four parallel vertical planes, carried to the foot of the three frontal convolutions to the frontal, the ascending parietal and the foot of the parietal lobules. Finally, each of these regions may be considered as itself formed of numerous bundles; thus in the pediculo-frontal we distinguish three: the superior, median and inferior.

This artificial limitation permits M. Pitres to classify the lesions of the *centrum ovale*, by comparing them to the superjacent convolutions; and in a second part he is then able to usefully analyze the numerous clinical observations. He first shows that lesions of the prefrontal zone, like those of the occipital, never cause any disorder, either motor or sensory, at least not directly, in the absence of complications. Lesions of the fronto-parietal zone alone, have, in the majority of cases, produced hemiplegic motor disorders, and sometimes also monoplegias. The existence of these monoplegias from injury to the *centrum ovale*, of numerous cases of aphonia from destruction of the left lower pediculo-frontal bundles, of brachial monoplegia from lesion of the upper and middle frontal bundles, etc., prove that the anatomical dissociation made by M. Pitres is true also functionally. The white substance of the centrum, in spite of its apparent homogeneity, is formed of bundles, each adapted to special conduction; in the fronto-parietal zone, the sole conductor of movements, the white bundles of fibres remain functionally distinct like the convolutions from whence they come; in fine, the lesions of the centrum and those of the superjacent convolutions produce exactly the same disorders.

It is to establish this last conclusion that M. Pitres gives the third part of his memoir. He shows that lesions of the centrum, like those of the fronto-parietal convolutions, are often latent; that the paralyzes are often transient and incomplete, or progressive; that they are often preceded or accompanied by contractures, or even by epileptic convulsions; that, finally, they may be followed by slow contracture with secondary degeneration. He

even discusses secondarily, the pathogeny of primary contractures, that of latent lesions, etc.

From this memoir leads a conclusion on which the author, perhaps, does not dwell with sufficient stress: the lesions of the *centrum ovale* and of the convolutions having the same symptomatology. Ought we not to admit with M. Vulpian, that the disorders of cortical origin are due to an irritation of the white fibres of the centrum, expanded in the convolutions, and not on the functionally homogeneous superjacent grey substance?

CHEMISTRY OF THE LIVING FROG'S HEART.—An article on the above subject by Dr. I. Gaule (*Archiv f. Anat. & Phys.*, 1878, III. & IV., p. 291), can be considered, unhesitatingly, as the most important contribution to muscular physiology which has appeared for years. His experiments (performed in the Strasburg Laboratory) refer to the chemical changes which occur in the excised frog's heart during its contractions. The entire organ was attached to Kronecker's double canula, through which the different fluids employed were passed. During observation the canula communicated with a small mercury-manometer, which registered the contractions on a kymographic cylinder. Each experiment was commenced by passing a current of 0.6 per cent. NaCl. solution through the heart, which as previous observers have found puts the heart into a state of complete diastolic rest, so soon as the last traces of blood are washed away. The results of Gaule's researches are sufficiently precise to be arranged in the form of theorems: 1. A heart which has ceased to contract after a thorough irrigation with 0.6 per cent. NaCl. solution, is recalled into activity by adding to the fluid a trace of sodic hydrate. The most powerful stimulation is obtained by a NaCl. solution containing one part of HNaO. in 20,000. Stronger solutions kill the heart, weaker fluids, down to 1 in 200,000, exert a less stimulant influence. The number of contractions in a given time does not vary, but the height of the contractions increases with the concentration, as is shown by the following table :

One part of HNaO. in 200,000 raised the mercury in the manometer in the average contraction,	3.5mm.
100,000	6.75
50,000	10.
20,000	16.75.

2. When the heart is once charged with a 0.6 per cent. NaCl. solution, containing a given amount of HNaO., the fatigue of the organ manifests itself in the gradual diminution of the height of the contractions. On refilling the heart with a fresh quantity of this same solution, the strength of the muscle is restored to a certain extent. After a time, however, the heart is completely exhausted and does not respond to a renewed filling. The time requisite varies with each heart, but it is shortened by passing a large quantity of fluid through the heart between each two observations. If, however, the heart is again charged with the fluid, *which has once passed through it*, it is slightly revived. Hence the conclusion, that the work of the heart depends on the potential energy of stored up material, which is dissolved and washed out by the solution passed through the heart.